

What is claimed is:

1 1. A liquid crystal display, comprising:
2 a first substrate;
3 a second substrate having a common electrode
4 opposite the first substrate;
5 a switching device disposed on a portion of the
6 first substrate, and the switching device
7 coupled between a data line and a pixel
8 electrode;
9 a color filter layer disposed between the switching
10 device and the first substrate; and
11 the data line disposed between the color filter and
12 the first substrate.

1 2. The liquid crystal display as claimed in claim
2 1, wherein the data line is a black matrix.

1 3. The liquid crystal display as claimed in claim
2 1, wherein the switching device is a back channel etched
3 thin film transistor.

1 4. The liquid crystal display device as claimed in
2 claim 1, further comprising an overcoat between the color
3 filter and the switching device.

1 5. The liquid crystal display device as claimed in
2 claim 1, further comprising a passivation layer covering
3 the switching device.

1 6. The liquid crystal display device as claimed in
2 claim 1, wherein a local conducting line connects the

3 switching device and the data line, and the local
4 conducting line and the pixel electrode are transparent
5 conducting material.

1 7. The liquid crystal display device as claimed in
2 claim 6, wherein the pixel electrode is disposed on the
3 overcoat and contacts the overcoat.

1 8. The liquid crystal display device as claimed in
2 claim 6, wherein a drain electrode of the switching
3 device extends to act as the pixel electrode, and a
4 source electrode of the switching device is extends to
5 contact the data line.

1 9. The liquid crystal display device as claimed in
2 claim 6, wherein the pixel electrode is disposed on a
3 passivation layer covering the switching device.

1 10. The liquid crystal display device as claimed in
2 claim 9, wherein the switching device comprises a gate
3 insulating layer between the passivation layer and the
4 overcoat.

1 11. The liquid crystal display device as claimed in
2 claim 1, wherein the switching device comprises a drain
3 electrode connecting to the pixel electrode and a source
4 electrode extending to the data line.

1 12. The liquid crystal display device as claimed in
2 claim 11, wherein the pixel electrode is under the drain
3 electrode.

1 13. The liquid crystal display device as claimed in
2 claim 11, wherein the switching device comprises a gate
3 insulating layer on the overcoat, the pixel electrode is
4 disposed on the gate insulating layer and contacts the
5 gate insulating layer.

1 14. The liquid crystal display device as claimed in
2 claim 11, wherein the pixel electrode is over the drain
3 electrode.

1 15. The liquid crystal display device as claimed in
2 claim 11, wherein the pixel electrode is disposed on a
3 passivation layer covering the switching device.

1 16. A method for manufacturing a liquid crystal
2 display comprising the steps of:

3 providing a substrate;

4 forming a data line on the substrate;

5 forming a color filter on the data line and the
6 substrate;

7 forming an overcoat on the color filter; and

8 forming a switching device on the overcoat, and the
9 switching device coupled between a data line and a pixel
10 electrode.

1 17. The method for manufacturing the liquid crystal
2 display as claimed in claim 16, wherein the data line is
3 a black matrix.

1 18. The method for manufacturing the liquid crystal
2 display as claimed in claim 16, wherein the switching
3 device is a back-channel-etched thin film transistor.

1 19. The method for manufacturing the liquid crystal
2 display device as claimed in claim 16, further comprising
3 forming an overcoat between the color filter and the
4 switching device.

1 20. The method for manufacturing the liquid crystal
2 display device as claimed in claim 16, further comprising
3 forming a passivation layer covering the switching
4 device.

1 21. The method for manufacturing the liquid crystal
2 display device as claimed in claim 16, wherein a local
3 conducting line connects the switching device and the
4 data line, and the local conducting line and the pixel
5 electrode are transparent conducting material.

1 22. The method for manufacturing the liquid crystal
2 display device as claimed in claim 21, wherein the pixel
3 electrode is disposed on the overcoat and contacts the
4 overcoat.

1 23. The method for manufacturing the liquid crystal
2 display device as claimed in claim 21, wherein a drain
3 electrode of the switching device extends to act as the
4 pixel electrode, and a source electrode of the switching
5 device is extends to contact the data line.

1 24. The method for manufacturing the liquid crystal
2 display device as claimed in claim 21, wherein the step
3 of forming the switching device on the overcoat
4 comprises:

5 forming a gate line on the overcoat;

6 forming a gate insulating layer, a semiconductor
7 layer and an n-doped layer on the gate line and
8 the overcoat;

9 patterning the n-doped layer and the semiconductor
10 layer;

11 forming a first opening in the gate insulating layer
12 and the overcoat exposing a surface of the data
13 line;

14 forming a transparent conducting layer on the n-
15 doped layer and the gate insulating layer and
16 in the first opening;

17 patterning the transparent conducting layer and the
18 n-doped layer to form the pixel electrode and
19 the local conducting line, wherein the pixel
20 electrode extends to act as a drain electrode
21 and the local conducting line extends to act as
22 a source electrode; and

23 forming a passivation layer covering the switching
24 device.

1 25. The method for manufacturing the liquid crystal
2 display device as claimed in claim 21, wherein the pixel
3 electrode is disposed on a passivation layer covering the
4 switching device.

1 26. The method for manufacturing the liquid crystal
2 display device as claimed in claim 25, wherein the step
3 of forming the switching device on the overcoat
4 comprises:

5 forming a gate line on the overcoat;

6 forming a gate insulating layer on the gate line and
7 the overcoat;

8 forming and patterning a semiconductor layer and an
9 n-doped layer on the gate line and the gate
10 insulating layer;

11 forming a metal layer on the semiconductor layer and
12 the gate insulating layer;

13 patterning the metal layer and the n-doped layer to
14 form a source electrode and a drain electrode;

15 forming a passivation layer covering the source
16 electrode, the drain electrode and the gate
17 insulating layer;

18 forming a first opening and a second opening in the
19 passivation layer and a third opening in the
20 passivation layer, the gate insulating layer
21 and the overcoat;

22 forming a transparent conducting layer on the
23 passivation layer and in the first, second and
24 third openings; and

25 patterning the transparent conducting layer to form
26 the pixel electrode connecting to the drain
27 electrode through the first opening and the
28 local conducting line connecting the source

29 electrode and the data lines through the second
30 and third openings respectively.

1 27. The method for manufacturing the liquid crystal
2 display device as claimed in claim 25, wherein the step
3 of forming the switching device on the overcoat
4 comprises:

5 forming a first opening in the overcoat to expose a
6 surface of the data line;

7 forming a gate line on the overcoat;

8 forming a gate insulating layer on the gate line,
9 the data line and the overcoat;

10 forming and patterning a semiconductor layer and an
11 n-doped layer on the gate line and the gate
12 insulating layer;

13 forming a metal layer on the semiconductor layer and
14 the gate insulating layer;

15 patterning the metal layer and the n-doped layer to
16 form a source electrode and a drain electrode;

17 forming a passivation layer covering the source
18 electrode, the drain electrode and the gate
19 insulating layer;

20 forming a second opening and a third opening in the
21 passivation layer and first opening extending
22 into the passivation layer and the gate
23 insulating layer;

24 forming a transparent conducting layer on the
25 passivation layer and in the first, second and
26 third openings; and

27 patterning the transparent conducting layer to form
28 the pixel electrode connecting to the drain
29 electrode through the second opening and the
30 local conducting line connecting to the source
31 electrode and the data line through the first
32 and third openings respectively.

1 28. The method for manufacturing the liquid crystal
2 display device as claimed in claim 25, wherein the step
3 of forming the switching device on the overcoat
4 comprises:

5 forming a first opening in the overcoat to expose a
6 surface of the data line;

7 forming a gate line on the overcoat;

8 forming and patterning a gate insulating layer, a
9 semiconductor layer and an n-doped layer on the
10 gate line and the overcoat;

11 forming a metal layer on the semiconductor layer and
12 the overcoat;

13 patterning the metal layer and the n-doped layer to
14 form a source electrode and a drain electrode;

15 forming a passivation layer covering the source
16 electrode, the drain electrode and the
17 overcoat;

18 forming a second opening and a third opening in the
19 passivation layer and the first opening
20 extending into the passivation layer;

21 forming a transparent conducting layer on the
22 passivation layer and in the first, second and
23 third openings; and

24 patterning the transparent conducting layer to form
25 the pixel electrode connecting to the drain
26 electrode through the second opening and the
27 local conducting line connecting the source
28 electrode and the data line through the first
29 and third openings respectively.

1 29. The method for manufacturing the liquid crystal
2 display device as claimed in claim 16, wherein the
3 switching device comprises a source electrode connecting
4 to the pixel electrode and a drain electrode extending to
5 contact the data line.

1 30. The method for manufacturing the liquid crystal
2 display device as claimed in claim 29, wherein the step
3 of forming the switching device on the overcoat
4 comprises:
5 forming a gate line on the overcoat;
6 forming a gate insulating layer on the overcoat;
7 forming and patterning a semiconductor layer and an
8 n-doped layer on the gate line and the gate
9 insulating layer;
10 forming a first opening in the gate insulating layer
11 and the overcoat to expose a surface of the
12 data line;
13 forming a metal layer on the semiconductor layer and
14 the gate insulating layer and in the first
15 opening;
16 patterning the metal layer and the n-doped layer to
17 form a source electrode extending to contact
18 the data line and a drain electrode;

19 forming a passivation layer covering the source
20 electrode, the drain electrode and the
21 overcoat;
22 forming a second opening in the passivation layer to
23 expose a surface of the drain electrode;
24 forming a transparent conducting layer on the
25 passivation layer and in the second opening;
26 and
27 patterning the transparent conducting layer to form
28 the pixel electrode connecting to the drain
29 electrode through the second opening.

1 31. The method for manufactureing the liquid
2 crystal display device as claimed in claim 25, wherein
3 the step of forming the switching device on the overcoat
4 comprises:
5 forming a gate line on the overcoat;
6 forming a gate insulating layer on the overcoat;
7 forming and patterning a semiconductor layer and an
8 n-doped layer on the gate line and the gate
9 insulating layer;
10 forming a first opening in the gate insulating layer
11 and the overcoat to expose a surface of the
12 data line;
13 forming the pixel electrode on the gate insulating
14 layer;
15 forming a metal layer on the semiconductor layer,
16 the pixel electrode and the gate insulating
17 layer and in the first opening;

18 patterning the metal layer and the n-doped layer to
19 form a source electrode extending to contact
20 the data line and a drain electrode extending
21 to cover the pixel electrode;
22 forming a passivation layer covering the switching
23 device.

1 32. The method for manufacturing the liquid crystal
2 display device as claimed in claim 29, wherein the pixel
3 electrode is under the drain electrode.

1 33. The method for manufacturing the liquid crystal
2 display device as claimed in claim 29, wherein the
3 switching device comprises a gate insulating layer on the
4 overcoat, the pixel electrode is disposed on the gate
5 insulating layer and contacts the gate insulating layer.

1 34. The method for manufacturing the liquid crystal
2 display device as claimed in claim 29, wherein the pixel
3 electrode is over the drain electrode.

1 35. The method for manufacturing the liquid crystal
2 display device as claimed in claim 29, wherein the pixel
3 electrode is disposed on a passivation layer covering the
4 switching device.